

**CLAIMS**

1. A method for monitoring the amplification of a plurality of different target polynucleotides in a single reaction chamber comprising the steps of:
  - (i) carrying out a reaction for the amplification of a plurality of different target polynucleotides;
  - (ii) during the amplification reaction contacting different amplified products with a molecule that binds to or interacts with a polynucleotide, the molecule being located in a spatially defined position or being determined via a non-linear or non-fluorescent technique; and
  - (iii) detecting the interaction between the amplified product and the molecule by measuring changes in applied radiation.
2. A method according to claim 1, wherein the molecule is immobilised to a support material.
3. A method according to claim 1 or claim 2, wherein the molecule is a polymerase enzyme.
4. A method according to claim 1 or claim 2, wherein the molecule is a polynucleotide, at least a portion of which is complementary to a region on an amplified product.
5. A method according to claim 4, wherein the molecule acts as a primer for the amplification reaction.
6. A method according to claim 4, wherein the molecule does not act as a primer for the amplification reaction.
7. A method according to any preceding claim, wherein deletion in step (iii) is carried out by detection of an evanescent field.

8. A method according to any preceding claim, wherein detection in step (iii) is carried out by applying surface electromagnetic waves and monitoring changes in the waves.
9. A method according to claim 7 or claim 8, wherein detection is carried out by measuring changes in surface plasmon resonance.
10. A method according to claim 9, wherein the molecule comprises a metallic particle.
11. A method according to any of claims 1-6, wherein detection in step (ii) is carried out by detecting surface enhanced Raman scattering.
12. A method according to any of claims 4-6, wherein detection in step (ii) is achieved by detecting an intercalating label that binds to the hybrid formed between the amplified product and polynucleotide during the amplification reaction.
13. A method according to claim 12, wherein the intercalating label is fluorescent when bound to the hybrid.
14. A method according to any of claims 1-6, wherein detection in step (iii) is achieved by monitoring changes in electrical conductance and/or capacitance.
15. A method according to any preceding claim, wherein the amplification reaction occurs in a sealed micro-flow cell.
16. Apparatus for monitoring a polynucleotide amplification reaction, comprising a support material having a plurality of molecules immobilised

thereon, the molecules having the ability to bind to or interact with a polynucleotide, and means for detecting changes in applied radiation.

17. An apparatus according to claim 16, further comprising a sealed micro-flow cell.

18. An apparatus according to claim 16 or claim 17, further comprising a pump to maintain a flow of fluid over the support material.